Title

The association of stigma with self-reported access to medical care and antiretroviral therapy adherence in persons living with HIV/AIDS.

Journal

Journal of general internal medicine, 24(10)

ISSN

0884-8734

Authors

Sayles, Jennifer N
Wong, Mitchell D
Kinsler, Janni J
et al.

Publication Date

2009-10-01

DOI

10.1007/s11606-009-1068-8

Peer reviewed

The Association of Stigma with Self-Reported Access to Medical Care and Antiretroviral Therapy Adherence in Persons Living with HIV/AIDS

Jennifer N. Sayles, MD, MPH[1], Mitchell D. Wong, MD, PhD[1], Janni J. Kinsler, PhD[1], David Martins, MD[2], and William E. Cunningham, MD, MPH[1,3]

[1]Division of General Internal Medicine and Health Services Research, David Geffen School of Medicine at University of California, Los Angeles, CA, USA; [2]Charles R. Drew University of Medicine and Science, Los Angeles, CA, USA; [3]Department of Health Services, UCLA School of Public Health, Los Angeles, CA, USA.

BACKGROUND: The stigma of HIV-infection may profoundly affect the lives of persons living with HIV/AIDS (PLHA). However few studies have examined the association of HIV stigma with multiple components of HIV treatment and care.

OBJECTIVES: To estimate the association between HIV stigma and: self-reported access to care, regular source of HIV care, and antiretroviral therapy adherence; and to test whether mental health mediates these associations.

DESIGN: Cross-sectional study.

PARTICIPANTS: 202 PLHA living in Los Angeles County in 2007.

MEASUREMENTS: Participants completed an anonymous survey, assessing internalized HIV stigma (28-items, alpha = 0.93), self-reported access to medical care (six items, alpha = 0.75), regular source of HIV care, and antiretroviral therapy (ART) adherence.

RESULTS: One-third of participants reported high levels of stigma; 77% reported poor access to care; 42.5% reported suboptimal ART adherence; and 10.5% reported no regular source of HIV care. In unadjusted analysis, those reporting a high level of stigma were more likely to report poor access to care (OR=4.97, 95% CI 2.54–9.72), regular source of HIV care (OR= 2.48, 95% CI 1.00–6.19), and ART adherence (OR= 2.45, 95% CI 1.23–4.91). In adjusted analyses, stigma was significantly associated with poor access to care (OR=4.42, 95% CI 1.88–10.37), but not regular source of HIV care or ART adherence. Mental health mediated the relationship between stigma and ART adherence, but not poor access to care or regular source of HIV care.

CONCLUSIONS: The association of stigma with self-reported access to care and adherence suggests that efforts to improve these components of HIV care will require a better understanding of the possible effects of stigma and it's mediators.

Received June 20, 2008
Revised October 30, 2008
Accepted July 6, 2009
Published online August 4, 2009

KEY WORDS: HIV/AIDS; HIV; stigma; care; antiretroviral.
J Gen Intern Med 24(10):1101–8
DOI: 10.1007/s11606-009-1068-8

INTRODUCTION

Advances in HIV treatment over the past decade have transformed HIV-infection from a fatal diagnosis into a manageable chronic illness.[1,2] Despite these dramatic advances, the social aspect of the illness–including the stigma of HIV–continues to threaten the emotional, mental, and physical well-being of persons living with HIV/AIDS (PLHA).

The concept of stigma is complex and is rooted in deviance from the values and social norms of a community.[3] Theoretical frameworks of stigma grounded in the sociological and anthropologic literature conceptualize stigma as a social process and have been applied to mental illness, epilepsy, and HIV/AIDS among other diseases.[4,5] The process of stigma involves the identification and labeling of human differences, linking labeled persons to negative stereotypes, and categorization to facilitate discrimination and unequal outcomes. Finally, the access to power of a dominant group further perpetuates the cycle of discrimination and social inequity.[5] In this conceptualization, "internalized stigma" occurs as the individual internalizes cultural norms that label him/her as a member of a deviant group, and assumes a "spoiled identity".[3] Additionally, "internalized stigma" parallels the concept of "perceived discrimination" in social psychology,[6,7] which has also been associated with important health outcomes, including delays in pharmacy refills and medical care.[8]

Few studies have examined the association of stigma with multiple components of HIV care simultaneously: including access to care, regular HIV care, and adherence to treatment. Furthermore, the effect of internalized HIV stigma on these outcomes has not been documented. Stigma may influence these outcomes through several possible pathways. One mechanism through which internalized stigma could affect self-reported access to care and having a regular source of care is through perceived discrimination. PLHA who experience greater stigmatization might perceive more difficulty accessing care because fear of rejection and discrimination (consequences of stigma) may lead them to perceive the health care setting as intolerant and inaccessible. The literature docu-

menting an association between perceived stigmatizing attitudes from a health care provider and poor access to medical care[9,10] lends credence to this assertion. Alternatively, poor mental health may confound or mediate the relationship between stigma and HIV care. Previous studies have described an association between stigma and depressive symptoms,[11,12] as well as an association between stigma and low levels of antiretroviral therapy (ART) adherence.[11,13] Additional studies suggest an association of mental health with access and adherence to ART.[14,15] Therefore, PLHA experiencing high levels of stigma may be more likely to perceive barriers to accessing and adhering to treatment because of depression or other mental illness. Mental illness symptoms may result directly from internalized stigma (suggesting mediation) or from other forces (suggesting confounding) and both relationships have some support from the existing literature.[16,17] Our study is among the first to formally test whether mental illness mediates the association between internalized stigma and access and adherence to HIV treatment. Another potential confounder of the association between internalized stigma and treatment is social disadvantage. The association between social disadvantage and care initiation, access, and adherence has been well documented,[8,18] and previous studies suggest an association between social disadvantage and perceived discrimination and stigma.[19,20]

In the present study, we hypothesized that internalized HIV stigma would be associated with three key components of HIV treatment: 1) self-reported access to medical care, 2) having a regular source of HIV care, and 3) self-reported ART medication adherence. We also tested a secondary hypothesis that mental health may mediate the relationship between stigma and one or more of these outcomes. We adapted the Andersen behavioral model of health services use to guide our study. This model describes the role of *predisposing factors* (e.g. stigma, mental health, race), *enabling factors* (e.g. insurance status), and *clinical need characteristics* (e.g. CD4 cell count), on *behavioral health outcomes* (access to care, regular source of HIV care, ART adherence).[21,22]

METHODS

Participants and Data Collection

We collected data from a diverse convenience sample of 202 HIV-positive adults in Los Angeles County in 2007. Participants were recruited from five community organizations providing outreach and social services to PLHA, as well as two HIV clinical care sites. By recruiting at community organizations and clinical sites, we were able to include both individuals who readily access the health system and those who may not. Eligible participants were 18 years of age or older, HIV-positive, able to answer questions in English, and capable of providing informed consent.

We recruited participants through research assistants stationed at the sites and organization staff also referred interested participants. Eligible participants were invited to complete a 154-item anonymous self-administered questionnaire, with a Flesh-Kincaid reading level of Grade 6.4 (Microsoft Word 2000, Redmond, WA). Participants were paid a $20 honorarium. Informed consent was obtained for all participants, and the UCLA IRB approved the study.

Measure of Internalized HIV Stigma

We measured internalized HIV stigma with a 28-item scale developed from previously published work by the authors.[12,23] Scale scores ranged from 0–100, with higher scores indicative of greater stigma. Internal reliability consistency for the overall measure was 0.93. Mean scores for the stigma subscales were computed, and the overall scale score was calculated as an average of the subscale scores. Because the distribution of stigma scores associated with the outcomes was not linear and suggested a threshold effect, we created a dichotomous variable of high internalized stigma for this analysis, such that participants who on average responded *some of the time, most of the time, or all of the time* (mean scale score of 50 or greater) were characterized as having high stigma.

Measure of Access to Care

We used a six-item access to care measure (alpha=0.75) derived from the HIV Cost and Services Utilization Study (HCSUS);[24] these items are presented in Table 3. All items had a five-point response scale (*strongly agree, somewhat agree, unsure, somewhat disagree, strongly disagree*). We created a scale by summing scores from the six items, with a range of possible values from 5–30. "Poor access to care" was defined as responding strongly to somewhat disagree or unsure to the six access items on average (corresponding to a score of 18 or higher). This measure has been associated with utilization of care.[24]

Regular Source of HIV Care

Having a regular source of HIV care was assessed by the question, "Do you currently have a regular place to go for your HIV medical care?" (*Yes/No*). This item has been associated with time to initiation of ART,[25] and time to entry into medical care.[26]

Measure of ART Adherence

Self-reported ART adherence was assessed using the item "How often during the past week were you able to take your antiretroviral medications exactly as your doctor or nurse told you?" Response options included *none of the time, a little of the time, some of the time, most of the time, all of the time*. In our analysis, optimal adherence was defined as "all of the time" and suboptimal adherence was all other response options. This item has been shown to be predict HIV viral load and CD4 cell count at this cut point.[27]

Measure of Mental Health

Mental health composite scores (MCS) were derived from the Medical Outcomes Study Short Form (SF-12), and scores were linearly transformed to T scores (mean = 50, SD=10; higher scores representing better health).[28,29] The MCS scale ranged from 1 – 100 and was divided into 10–point increments (i.e. 1 – 10, 11 – 20, etc.) for this analysis.

Other Independent Variables

Other independent variables in the analysis included *predisposing factors*: age, gender, race/ethnicity, education, primary language, relationship status, sexual orientation, history of

intravenous drug use (IDU); *enabling factors*: income, health insurance; and *clinical need characteristics*: years since HIV diagnosis, CD4 cell count, currently on ART.

Data Analysis

We first examined the distributions of all independent and dependent variables. We then examined the bivariate associations between the predisposing factor of high internalized stigma and the health behavior outcomes. We constructed three separate multiple logistic regression models to estimate the adjusted association between each outcome variable and high internalized stigma, controlling for predisposing, enabling, and clinical need characteristics.

As a secondary goal of the study, we examined whether mental health mediated the relationship between stigma and each outcome.[30] Specifically, first we examined the association between stigma and MCS. Next, we examined the association between MCS and each of the three outcome variables in separate models. If these first two associations are significant, then the possibility of a mediation relationship is heightened. According to standard criteria for assessing mediation, next we examined the association between stigma and the outcomes. In the final step, we examined the extent to which the association between stigma and the outcomes was attenuated by adding MCS to the model. We conducted these mediation analyses in bivariate models, followed by multivariate models.

We used multiple imputation by chained equations (MICE) with five replications to impute missing values for two variables: history of IDU (11 observations missing), and CD4 cell count (38 observations missing). Li-Raghunathan-Rubin estimates were used for calculating standard errors.[31] All analyses were conducted using STATA 10.0 (Stata Corp, College Station, TX).

Table 1. Predisposing, Enabling, and Clinical Need Characteristics of Sample (N=202)

CHARACTERISTICS	
Predisposing Factors	
Age % (n)	–
18–35	20.0 (40)
36–49	54.0 (109)
50+	26.0 (53)
Gender % (n)	–
Male	49.5 (100)
Female	49.0 (99)
Female transgender	1.5 (3)
Race % (n)	–
African American	56.0 (112)
White	28.0 (56)
Latino/a	10.0 (20)
Other	6.0 (12)
Education % (n)	–
No / Some high school	24.0 (48)
Graduated from high school	46.0 (92)
College	30.0 (60)
Primary language English % (n)	94.0 (191)
Married / In a committed relationship % (n)	27.2 (55)
Sexual orientation % (n)	–
Heterosexual	69.3 (140)
Homosexual / Bisexual	30.7 (62)
History of intravenous drug use (IDU) % (n)	22.5 (43)
Mental health composite score (mean + standard deviation)	40.1+11.2
Enabling factors	
Income below FPL* % (n)	54.0 (109)
No health insurance % (n)	55.5 (111)
Clinical need characteristics	
Years since HIV diagnosis % (n)	–
0–5 yrs	22.2 (43)
6–10 yrs	26.3 (51)
>10 yrs	51.5 (100)
Current CD4 cell count < 200 (cells/ul) % (n)	15.8 (32)
Currently taking antiretroviral therapy % (n)	71.4 (142)

* *FPL = federal poverty level for family of two , less than $1140 per month*

RESULTS

Sample Characteristics

Two hundred and two participants completed the survey, and refusal rates ranged from 10% to 30% by site. Participant characteristics are presented in Table 1. Fifty percent of the sample was female, and the mean age was 43 years. Fifty-six percent were African American, 28% were White, and 10% were Latino/a. The mean MCS score was 40.1 in the sample, with a standard deviation of 11.2.

Internalized HIV Stigma

Mean scores for each stigma item, subscales, and the overall stigma scale are presented in Table 2. The mean score on the overall stigma scale of 41 reflects that on average participants endorsed items describing experiences or perceptions of stigma slightly less frequently than "some of the time"(mean score of 50).

Access to Care, Regular Source of HIV Care, and ART Adherence

Seventy-seven percent of participants reported poor access to care on one or more of the items (Table 3). Approximately 10% reported having no regular source of HIV care. Of the 142 participants currently taking ART, 42.5% reported suboptimal adherence.

Association of Internalized Stigma with Access, Regular Source of Care, and Adherence

In bivariate analyses, participants experiencing high internalized stigma more frequently reported poor access to care, no regular source of HIV care, and suboptimal ART adherence (Table 4). Respondents diagnosed with HIV in the past five years had significantly increased odds of reporting high levels of stigma compared with those diagnosed more than five years ago (OR= 2.49; 95% CI=1.25, 4.98). MCS was significantly related to high levels of stigma (OR=12.95, 95% CI=6.14, 37.10), as well as poor self-reported access, no regular source of HIV care, and suboptimal ART adherence (Table 4). Internalized stigma was not associated with any of the other independent variables.

In multivariable analysis, internalized stigma was strongly associated with poor access to care (OR=4.42; 95% CI=1.88, 10.37) but not the other two outcomes (Table 5). Poor access to care was also significantly associated with younger age (OR= 5.43; 95% CI=1.52, 19.43), a history of IDU (OR=3.19; 95% CI=1.24, 8.20), and income below FPL (OR=2.50; 95% CI=1.10, 5.68). Having no regular source of HIV care was significantly associated with younger age (OR=7.39; 95%

Table 2. Internalized Stigma Scale Items and Scores

Internal Stigma Scale items*	Mean (SD) †
Subscale 1 = Stereotypes of HIV	48 (21)
1. HIV is different than other diseases like cancer because people with HIV are judged	66 (29)
2. People assume I have done something bad to get HIV	53 (32)
3. Society looks down on people who have HIV	59 (28)
4. People think that if you have HIV then you got what you deserve	43 (30)
5. People blame me for having HIV	43 (35)
6. People assume I slept around because I have HIV	54 (33)
7. People think that if you have HIV you do not deserve to have children	50 (34)
8. People are afraid to let someone with HIV adopt a child	57 (29)
9. People think I am a bad person because I have HIV	34 (32)
10. Medical providers assume people with HIV sleep around	38 (31)
11. People lose their jobs because they have HIV	46 (26)
12. People think you can't be a good parent if you have HIV	42 (31)
Subscale 2 = HIV Disclosure Concerns	32 (27)
13. I am concerned if I go to the HIV clinic someone I know might see me	28 (33)
14. I am concerned if I have physical changes from the HIV medicines people will know I have HIV	33 (33)
15. I am concerned if I go to an AIDS organization someone I know might see me	30 (34)
16. I am concerned people will find out I have HIV by looking at my medical paperwork	32 (35)
17. I am concerned that if I am sick people I know will find out about my HIV	38 (35)
Subscale 3 = Social Relationship Stigma	29 (24)
18. Nurses and doctors treat people who have HIV as if they are contagious	30 (30)
19. Nurses and doctors dislike caring for patients with HIV	28 (28)
20. I feel abandoned by family members because I have HIV	24 (33)
21. People treat me as less than human now that I have HIV	29 (31)
22. People avoid me because I have HIV	24 (30)
23. People I am close to are afraid they will catch HIV from me	26 (32)
24. I feel like I am an outsider because I have HIV	41 (35)
Subscale 4 = Self-Acceptance	54 (25)
25. I feel ashamed to tell other people that I have HIV	45 (36)
26. I am comfortable telling everyone I know that I have HIV‡	61 (35)
27. My family is comfortable talking about my HIV‡	55 (33)
28. It is important for a person to keep HIV a secret from co-workers	56 (33)
Overall Stigma Scale	41 (19)

* *Responses to each item are on a 5-point categorical response scale (none of the time, a little of the time, some of the time, most of the time, or all of the time)*

† *Possible range 0-100 with higher scores indicate greater levels of internalized stigma*

‡ *Response scale values reversed for scoring*

CI=1.26, 43.42). Finally, increased odds of suboptimal ART adherence were found among respondents with lower MCS (OR=1.50; 95% CI=1.01, 2.25) and those who identified as heterosexual (OR=2.92; 95% CI=1.07, 7.98). All four stigma subscales were significantly associated with poor self-reported access to care. None of the subscales were significantly associated with regular source of care (latter data not shown).

Mental Health as Mediator of Relationships of Stigma with Access to Care and Adherence

To examine mental health as a potential mediator of the relationship between stigma and our outcomes of interest, we tested the mediation model as presented in Fig. 1. As described earlier, stigma was significantly associated with MCS, as well as with the outcomes of self-reported access to care and suboptimal ART adherence. MCS was also significantly associated with these two outcomes, controlling for the covariates. Therefore, the conditions for the mediation hypothesis were met. When the MCS was added to the model predicting poor self-reported access to care, high stigma remained significantly associated with poor access (OR=5.14, 95% CI=2.39, 11.90 without MCS and OR=4.42, 95% CI=1.88, 10.37 with MCS). When the MCS was added to the model predicting suboptimal ART adherence, we found that association between high stigma and adherence was no longer statistically significant (OR=3.15, 95% CI=1.35, 7.36 without MCS and OR=2.09; 95% CI=0.81, 5.39 with MCS). The results in both models were similar when observations with missing data were excluded from the analysis.

DISCUSSION

In this diverse sample of PLHA in Los Angeles County, approximately one-third of participants reported experiencing high levels of internalized HIV stigma. We found that respondents experiencing high levels of stigma had over four times the odds of reporting poor access to care. Mental health

Table 3. Frequency of HIV-Positive Persons Reporting Health Behavior Outcomes of Poor Access to Care, No Regular Source of HIV Care, and Suboptimal ART Adherence

Poor access to care items (n=202)	Disagree responses (%)*
1. I am able to get medical care whenever I need it	24.0
2. Places where I can get medical care are very conveniently located	26.4
3. I have never gone without the medical care I needed because it is too expensive	42.3
4. I have easy access to the medical specialists that I need	22.4
5. It is easy for me to get medical care in an emergency	40.3
6. If I need hospital care, I can get admitted without any trouble	27.9
Overall: Reported poor access to 1 or more of the above items	77.0
No regular source of HIV Care (n=202)	**No**
Do you currently have a regular place to go for your HIV medical care?	10.5
Suboptimal ART adherence (n=142)	**Less than all the time †**
How often during the past week were you able to take your antiretroviral medications exactly as your doctor or nurse told you to?	42.5

* *Poor access defined as strongly/somewhat disagree or unsure to the items above*

† *Suboptimal ART adherence defined as taking antiretroviral therapy none, a little, some, or most of the time (vs. all the time)*

Table 4. Bivariate Associations of Predisposing, Enabling, and Clinical Need Characteristics with Health Behavior Outcomes of Poor Self-Reported Access to Care, No Regular Source of HIV Care, and Suboptimal ART Adherence

Dependent variable (Reference group)	Poor self-reported access to care odds ratio (95% CI) (n=202)	No regular source of HIV care odds ratio (95% CI) (n=202)	Suboptimal ART adherence odds ratio (95% CI) (n=142)
Predisposing factors			
High internalized stigma (no)	–	–	–
Yes	4.97 (2.54–9.72)	2.48 (1.00–6.19)	2.45 (1.23–4.91)
Mental health status	–	–	–
Mental health composite score (10-point increase)	1.73 (1.31–2.29)	1.54 (1.03– 2.31)	1.53 (1.12–2.09)
Age	–	–	–
18–35	4.87 (2.11–11.23)	4.82 (1.87–12.41)	2.72 (1.03–7.18)
36–49	0.46 (0.26–0.81)	0.59 (0.23–1.46)	0.63 (0.32–1.25)
50 and over	0.85 (0.46–1.60)	0.26 (0.06–1.17)	0.80 (0.39–1.64)
Gender (male)	–	–	–
Female	0.76 (0.44–1.32)	1.11 (0.45–2.76)	1.66 (0.87–3.19)
Race / Ethnicity (white)	–	–	–
African American	1.06 (0.61–1.86)	1.12 (0.45–2.80)	1.32 (0.69–2.53)
Latino/a	1.44 (0.56–3.68)	0.93 (0.20–4.36)	1.91 (0.66–5.58)
Other Race	0.92 (0.29–2.95)	0.76 (0.92–6.23)	0.92 (0.24–3.50)
Education (more than high school diploma)	–	–	–
High school diploma	0.86 (0.50–1.50)	1.51 (0.65–4.00)	1.11 (0.60–2.06)
Less than high school	1.25 (0.65–2.40)	0.72 (0.23–2.24)	1.68 (0.77–3.65)
Sexual orientation (homosexual / bisexual)	–	–	–
Heterosexual	0.74 (0.43–1.30)	1.63 (0.63–4.23)	2.35 (1.23–4.50)
History of IDU (no)	–	–	–
Yes	2.94 (1.41–6.11)	2.40 (0.92–6.27)	1.72 (0.79–3.73)
Enabling Factors			
Income (above FPL*)	–	–	–
Below FPL	1.96 (1.12–3.43)	1.20 (0.48–2.99)	1.01 (0.49–2.08)
Insurance (yes)	–	–	–
No	0.53 (0.30–0.92)	0.59 (0.24–1.46)	1.05 (0.55–1.98)
Clinical need characteristics			
Yrs since HIV diagnosis (>5)	–	–	–
Less than 5 yrs	2.58 (1.26–5.32)	2.49 (0.95–6.47)	0.87 (0.36–2.06)
CD4 count (above 200)	–	–	–
Below 200	0.91 (0.43–1.94)	0.52 (0.11–2.36)	0.65 (0.26–1.61)

* *FPL = federal poverty level for family of two, less than $1140/month income*

attenuated the association between stigma and suboptimal ART adherence, suggesting that the relationship between stigma and ART adherence is mediated by mental health. Additional prospective longitudinal studies in larger samples are needed to better understand possible mediators of the associations between HIV stigma and access to care and ART adherence. This may in turn help to guide interventions to improve HIV care and health outcomes for PLHA.

Our findings demonstrate that in a diverse and underserved sample of PLHA, poor self-reported access to medical care is strongly associated with experiencing HIV stigma. It did not appear that mental health or other predisposing, enabling, or clinical need factors explained this association. Poor self-reported access to care could also itself be a result of the perceived discrimination and social inequities that are central to the process of stigma. In this scenario, it is possible that an omitted variable that reflects perceived discrimination and social disadvantage may influence both experiences of stigma and self-reported access to care.

Interestingly, we found that stigma was not strongly associated with having a regular source of HIV care in our sample after controlling for predisposing, enabling, and clinical need characteristics. One explanation for this may be that stigma has less of a role in an established patient-provider relationship compared with other factors such as patient-provider concordance by race or gender, satisfaction, communication, and trust.[32,33] Alternatively, we may have failed to identify an association because the percentage of the sample reporting no regular source of HIV care was small (10.5%).

Our data suggest that HIV stigma may be associated with suboptimal ART adherence, and this relationship may be partially mediated by lower mental health status. Specifically, lower MCS was associated with suboptimal adherence, and when MCS was included in the mediation model, the association with stigma was attenuated and no longer significant. This is consistent with previously published studies that demonstrate that stigma and depression influence ART adherence.[11,15] However, the interrelationship and pathways between stigma and other factors known to be associated with adherence such as social support,[34] self-efficacy,[35] and attitudes toward medication[36] need to be further delineated in future studies in order to identify targets for effective intervention programs.

In our study, PLHA diagnosed within the last 5 years reported higher levels of stigma than those living longer with the disease, suggesting that stigma may attenuate over time. Future longitudinal studies should examine how HIV stigma changes over time and with disease progression, as many PLHA may live decades with this chronic disease. This finding also suggest that addressing internalized stigma and its

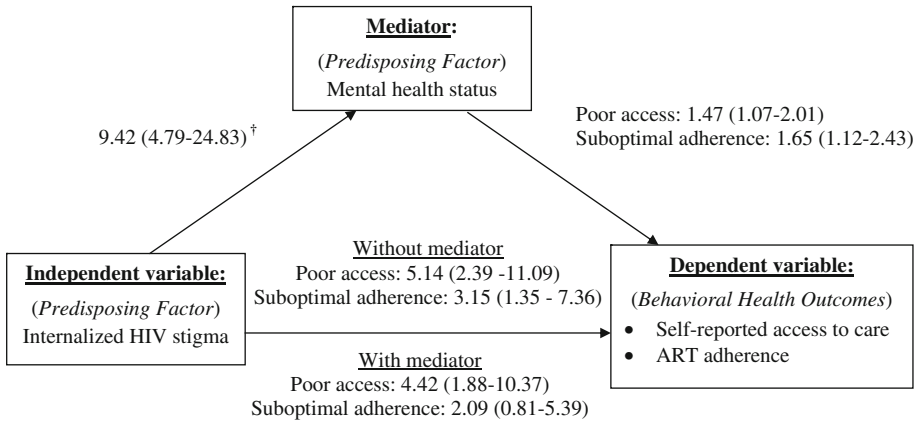
Table 5. Multivariable Associations of Internalized Stigma with Poor Access to Care, No Regular Source of HIV Care, and Suboptimal ART Adherence

Dependent Variable (Reference group)	Poor Self-Reported Access to Care Odds ratio (95% CI) (n=202)	No Regular Source of HIV Care Odds ratio (95% CI) (n=202)	Suboptimal ART Adherence Odds ratio (95% CI) (n=142)
Predisposing Factors			
High internalized stigma (no)	–	–	–
Yes	4.42 (1.88–10.37)	2.25 (0.69–7.32)	2.09 (0.81–5.39)
Mental health status	–	–	–
Mental Health Composite Score (10-point increase)	1.22 (0.87–1.71)	1.16 (0.68–1.99)	1.50 (1.01–2.25)
Age (50+)	–	–	–
18–35	5.43 (1.52–19.43)	7.39 (1.26–43.42)	3.35 (0.90–12.45)
36–49	0.71 (0.30–1.68)	1.93 (0.36–10.41)	0.64 (0.23–1.75)
Gender (male)	–	–	–
Female	0.87 (0.38–1.99)	0.97 (0.29–3.21)	1.52 (0.61–3.81)
Race / Ethnicity (white)	–	–	–
African American	1.34 (0.54–3.30)	0.93 (0.25–3.48)	1.42 (0.51–3.98)
Latino/a	1.65 (0.45–6.08)	1.54 (0.22–10.79)	3.34 (0.72–15.58)
Other race	1.30 (0.23–7.21)	0.78 (0.06–9.73)	0.88 (0.13–6.11)
Education (more than high school)	–	–	–
High school diploma	1.01 (0.41–2.50)	1.28 (0.34–4.82)	1.21 (0.42–3.49)
Less than high school	1.47 (0.44– 4.93)	0.51 (0.08–3.41)	1.35 (0.35–5.20)
Sexual orientation (homosexual / bisexual)	–	–	–
Heterosexual	0.56 (0.23–1.36)	2.42 (0.67–8.78)	2.92 (1.07– 7.98)
History of IDU (no)	–	–	–
Yes	3.19 (1.24–8.20)	1.89 (0.56–6.36)	1.78 (0.66–4.84)
Enabling factors			
Income (above FPL*)	–	–	–
Below FPL	2.50 (1.10–5.68)	1.27 (0.40–4.07)	0.96 (0.38–2.40)
Insurance (yes)	–	–	–
No	0.61 (0.29–1.30)	0 .89 (0.29–2.72)	1.50 (0.61–3.66)
Clinical need characteristics			
Yrs since HIV diagnosis (>5)	–	–	–
Less than 5 yrs	1.15 (0.44–3.00)	1.98 (0.62–6.32)	0.36 (0.12–1.09)
CD4 count (above 200)	–	–	–
Below 200	0.64 (0.25–1.64)	0.42 (0.08–2.19)	0.78 (0.25–2.37)

* *FPL = federal poverty level for family of two, less than $1140/month*

potential impact on HIV treatment may be particularly important to incorporate into programs targeting recently diagnosed PLHA.

There were several limitations to this study. First, as our data were cross-sectional, causality between internalized HIV stigma and our outcomes cannot be established. Also, potentially important covariates such as social inequality, social support, and self-efficacy were not observed in our models. However, our study does provide valuable information about the strong association between stigma and self-reported access



*Mediation models control for age, gender, race/ethnicity, education, sexual orientation, history of intravenous drug use, income, insurance status, years since diagnosis, and CD4 count.
†Relationship expressed as OR (95 % CI).

Figure 1. Mediation model to explore the role of mental health in mediating the associations between internalized HIV stigma and poor access to care and suboptimal art adherence*.

to care and adherence, and directs future work to further delineate these relationships. Second, our study sample may be biased (ascertainment bias) toward people who have already partially engaged in medical care or social services, and it may underestimate the association between poor access and internalized stigma for the most vulnerable group of PLHA who do not access care or HIV services at all. Finally, although we successfully recruited a sample of diverse PLHA, non-English speakers such as Latino/as and Asian Americans were underrepresented in our sample.

Despite these limitations, our study provides important information about the association between internalized HIV stigma and self-reported access to medical care and ART adherence. Prospective studies that include more objective measures of access to care, such as utilization of subspecialty care, HIV care, preventive care, and emergency/hospital care, would help us to better understand the access needs of underserved PLHA over the course of their disease. Prospective studies could also help us to examine the directionality of the association between stigma and access to care, as well as to identify additional factors that may mediate or moderate this relationship. Finally, such studies could enable us to examine changes in stigma and its contribution to health care and health outcomes throughout the disease trajectory.

Acknowledgements: *This research was supported by grants from the American Foundation for AIDS Research (AmfAR) and the California HIV Research Program (CHRP) Network For AIDS Research in Los Angeles (NARLA). Dr. Sayles also was supported by NIMH grant K23MH083535. Dr. Cunningham was partially supported by NIH grants P20MD000182 from NCMHD and P30AG021684 from the National Institute on Aging. This work was presented at the 3rd International Conference on HIV Treatment Adherence on March 17, 2008 and the 31st Annual Conference of the Society of General Internal Medicine on April 10, 2008. The contributions of Sherman Ho and Natalie St. Cyr are gratefully acknowledged.*

Conflict of Interest: *None disclosed.*

Corresponding Author: *Jennifer N. Sayles, MD, MPH; Division of General Internal Medicine and Health Services Research, David Geffen School of Medicine at University of California, 911 Broxton Ave., Los Angeles, CA 90024, USA (e-mail: jsayles@mednet.ucla.edu).*

REFERENCES

1. **Hogg RS, Heath KV, Yip B, et al.** Improved survival among HIV-infected individuals following initiation of antiretroviral therapy. JAMA. 1998;279(6):450–4.
2. **Jensen-Fangel S, Pedersen L, Pedersen C, et al.** Low mortality in HIV-infected patients starting highly active antiretroviral therapy: a comparison with the general population. AIDS (London). 2004;18(1):89–97.
3. **Goffman E.** Notes on the management of spoiled identity. New York: Simon & Schuster; 1963.
4. **Parker R, Aggleton P.** HIV and AIDS-related stigma and discrimination: a conceptual framework and implications for action. Soc Sci Med (1982). 2003;57(1):13–24.
5. **Link BG, Phelan JC.** Conceptualizing stigma. Annu Rev Sociology. 2001;27(1):363–85.
6. **Major B, O'Brien LT.** The social psychology of stigma. Ann Rev Sociology. 2005;56:393–421.
7. **Clark R, Anderson NB, Clark VR, Williams DR.** Racism as a stressor for African Americans: A biopsychosocial model. Am Psychol. 1999;54(10):805–16.
8. **Van Houtven CH, Voils CI, Oddone EZ, et al.** Perceived discrimination and reported delay of pharmacy prescriptions and medical tests. J Gen Intern Med. 2005;20(7):578–83.
9. **Kinsler JJ, Wong MD, Sayles JN, Davis C, Cunningham WE.** The effect of perceived stigma from a health care provider on access to care among a low-income HIV-positive population. AIDS Patient Care and STDs. 2007;21(8):584–92.
10. **Schuster MA, Collins R, Cunningham WE, et al.** Perceived discrimination in clinical care in a nationally representative sample of HIV-infected adults receiving health care. J Gen Intern Med. 2005;20(9):807–13.
11. **Vanable PA, Carey MP, Blair DC, Littlewood RA.** Impact of HIV-related stigma on health behaviors and psychological adjustment among HIV-positive men and women. AIDS Behav. 2006;10(5):473–82.
12. **Sayles JN, Ryan GW, Silver JS, Sarkisian CA, Cunningham WE.** Experiences of social stigma and implications for healthcare among a diverse population of HIV positive adults. J Urban Health. 2007;84(6):814–28.
13. **Rintamaki LS, Davis TC, Skripkauskas S, Bennett CL, Wolf MS.** Social stigma concerns and HIV medication adherence. AIDS Patient Care & STDs. 2006;20(5):359–68.
14. **Cunningham WE, Hays RD, Ettl MK, et al.** The prospective effect of access to medical care on health-related quality-of-life outcomes in patients with symptomatic HIV disease. Med Care. 1998;36(3):295–306.
15. **Starace F, Ammassari A, Trotta MP, et al.** Depression is a risk factor for suboptimal adherence to highly active antiretroviral therapy. J Acquir Immune Defic Syndr Hum Retrovirol. 2002;31(Suppl 3):S136–9.
16. **DiIorio C, McCarty F, DePadilla L, et al.** Adherence to antiretroviral medication regimens: A test of a psychosocial model. AIDS Behav. 2009;13(1):10–22.
17. **Waddell EN, Messeri PA.** Social support, disclosure, and use of antiretroviral therapy. AIDS Behav. 2006;10(3):263–72.
18. **Casagrande SS, Gary TL, LaVeist TA, Gaskin DJ, Cooper LA.** Perceived discrimination and adherence to medical care in a racially integrated community. J Gen Intern Med. 2007;22(3):389–95.
19. **Wingood GM, DiClemente RJ, Mikhail I, et al.** HIV discrimination and the health of women living with HIV. Women Health. 2007;46(2):99–112.
20. **Corrigan P, Thompson V, Lambert D, Sangster Y, Noel JG, Campbell J.** Perceptions of discrimination among persons with serious mental illness. Psychiatr Serv. 2003;54(8):1105–10.
21. **Aday LA, Andersen R.** A framework for the study of access to medical care. Health Serv Res. 1974;9(3):208–20.
22. **Shapiro MF, Morton SC, McCaffrey DF, et al.** Variations in the care of HIV-infected adults in the United States: Results from the HIV cost and services utilization study. JAMA, J Am Med Assoc. 1999;281(24):2305–15.
23. **Sayles JN, Hays RD, Sarkisian CA, Mahajan AP, Spritzer KL, Cunningham WE.** Development and psychometric assessment of a multidimensional measure of internalized HIV stigma in a sample of HIV-positive adults. AIDS Behav. 2008;12(5):748–58.
24. **Cunningham WE, Andersen RM, Katz MH, et al.** The impact of competing subsistence needs and barriers on access to medical care for persons with human immunodeficiency virus receiving care in the United States. Med Care. 1999;37(12):1270–81.
25. **Celentano DD, Galai N, Sethi AK, et al.** Time to initiating highly active antiretroviral therapy among HIV-infected injection drug users. AIDS. 2001;15(13):1707–15.
26. **Turner BJ, Cunningham WE, Duan N, et al.** Delayed medical care after diagnosis in a US national probability sample of persons infected with human immunodeficiency virus. Arch Intern Med. 2000;160(17):2614–22.
27. **Mannheimer S, Friedland G, Matts J, Child C, Chesney M.** The consistency of adherence to antiretroviral therapy predicts biologic outcomes for human immunodeficiency virus-infected persons in clinical trials. Clin Infect Dis. 2002;34(8):1115–21.
28. **Hays RD, Cunningham WE, Sherbourne CD, et al.** Health-related quality of life in patients with human immunodeficiency virus infection in the United States: results from the HIV cost and services utilization study. Am J Med. 2000;108(9):714–22.
29. **Ware Jr JE, Kosinski M, Keller SD.** A 12-item short-form health survey: construction of scales and preliminary tests of reliability and validity. Med Care. 1996;34(3):220–33.
30. **Baron RM, Kenny DA.** The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. J Pers Soc Psychol. 1986;51(6):1173–82.

31. **Royston P.** Multiple imputation of missing values: update. Stata J Dec. 2005;5(4):527–36.
32. **King WD, Wong MD, Shapiro MF, Landon BE, Cunningham WE.** Does racial concordance between HIV-positive patients and their physicians affect the time to receipt of protease inhibitors? J Gen Intern Med. 2004;19(11):1146–53.
33. **Sohler NL, Fitzpatrick LK, Lindsay RG, Anastos K, Cunningham CO.** Does patient–provider racial/ethnic concordance influence ratings of trust in people with HIV infection? AIDS Behav. 2007;11(6):884–96.
34. **Edwards LV.** Perceived social support and HIV/AIDS medication adherence among African American women. Qual Health Res. 2006;16(5):679–91.
35. **Catz SL, Kelly JA, Bogart LM, Benotsch EG, McAuliffe TL.** Patterns, correlates, and barriers to medication adherence among persons prescribed new treatments for HIV disease. Health Psychol. 2000;19(2):124–33.
36. **Graham J, Bennett IM, Holmes WC, Gross R.** Medication beliefs as mediators of the health literacy–antiretroviral adherence relationship in HIV-infected individuals. AIDS Behav. 2007;11(3):385–92.